REMARKS/ARGUMENTS

The present response is being filed within two (2) months after the mailing date of the final rejection.

Claims 1-34 remain in the application.

Claim 1 only is currently amended.

Claim Rejections Under 35 USC § 103

Claims 1, 16 and 30-34 were rejected under 35 USC § 103(a) over US Patent 3,755,628 to Games and further in view of US Patent 6,133,846 to Birkedahl.

The invention as presently claimed is patentable over both Games and Birkedahl, individually and in combination.

The present invention is clearly not made obvious by the Games reference .

The present invention, as currently recited in claim 1, is a network topology backplane bus architecture wherein a plurality of independent data communication lines is subdivided into a first subset comprising a first plurality of the data communication lines, and a second subset comprising a second plurality of the data communication lines, wherein one processing node is connected for both transmitting and receiving on the first subset of data communication lines, but is connected for only receiving on the second subset of data communication lines; and a second processing node is connected for both transmitting and receiving on the second subset of said data lines, but is connected for only receiving on the first subset of data lines.

In clear contrast to the present invention, Games teaches only a multi-redundant data synchronized transmission system having multiple communications units 22-25 each including a respective transmitter 26-29 and receiver 30-33, with each transmitter 26-29 and each receiver 30-33 all being connected to all three channels A, B, C of a triple-redundant communication link 36. Column 3, lines 46-56.

As taught by Games, each and every receiver 30-33 transmits identical words on all three channels A, B, C at adjacent word periods. Column 3, line 60-column 4, line 10.

The Office Action admits, and the Applicant agrees, that Games fails to disclose or suggest one of the processing nodes being connected for only receiving on a second subset of data

communication lines, and another of the processing nodes being connected for only receiving on the first subset of data lines.

For each of the above reasons, claim 1 is allowable over the Games reference.

Birkedahl is an improper reference as it currently owned by the same party as the instant application. As shown by the notice on the cover page, Honeywell Inc. of Minneapolis, Minn. is the assignee of record of the Birkedahl patent. Honeywell Inc. of Minneapolis, Minn. was acquired by AlliedSignal Inc. which is the owner of the present application. Accordingly, AlliedSignal Inc., now re-named Honeywell International, Inc., is the assignee of record of both the Birkedahl patent and the instant application. Birkedahl is therefore disqualified as a reference against the instant application.

Furthermore, even if Birkedahl was not disqualified as a reference, even though the Applicant believed Birkedahl is disqualified, Birkedahl still fails to provide the deficiencies of Games.

Birkedahl fails to disclose or suggest a plurality of independent data communication lines is subdivided into a first subset comprising a first plurality of the data communication lines, and a second subset comprising a second plurality of the data communication lines, wherein one processing node is normally connected for both transmitting and receiving on the first subset of data communication lines, but is normally connected for only receiving on the second subset of data communication lines; and a second processing node is normally connected for both transmitting and receiving on the second subset of said data lines, but is normally connected for only receiving on the first subset of data lines, as presently recited in claim 1.

Rather, in clear contrast to the present invention, Birkedahl teaches avionics components 110 coupled for a pilot's bus 107L and a co-pilot's bus 107R, each bus being in communication with each avionics component 110.

In addition, Birkedahl teaches a pilot's backup bus 107LB interconnect avionics components 110 on the pilot's side of the aircraft, and a co-pilot's backup bus 107RB interconnect avionics components 110 on the co-pilot's side of the aircraft.

Each avionics component 110 utilizes a network interface controller (NIC) 111 to transmit and receive data. The NICs 111 communicate simultaneously with the pilot's side bus

107L, the co-pilot's side bus 107R, and a respective one of a pilot's backup bus 107LB and a different co-pilot's backup bus 107RB.

See, e.g., Birkedahl at column 4, lines 5-34, as reproduced below:

> Referring to FIG. 3, avionics components 110 are organized into a pilot's side and a co-pilot's side. There is provided a pilot's bus 107L and a co-pilot's bus 107R, each bus being in communication with each avionics component 110.
>
> In addition to the primary pilot's bus 107L and co-pilot's bus 107R, a pilot's backup bus 107LB and a co-pilot's backup bus 107RB interconnect avionics components 110 on the same side of the aircraft. It is a critical component of this invention that each bus conform to IEEE 802.3 ethernet standards. In the preferred embodiment, each bus will be embodied as a coaxial cable. RG-58 thin coaxial cable is particularly well-suited to the present invention, although any type of coaxial cable conforming to the ethernet specification may be used.
>
> Avionics components 110 communicate via the ethernet-compliant data buses 107. Each avionics component [110] utilizes a network interface controller (NIC) 111 to **transmit** and **receive** data. The NICs [111] utilized in the present system communicate **simultaneously** with the pilot's side bus 107L, the co-pilot's side bus 107R, and at least one backup bus. These NICs [111] may be coupled to each data bus through standard ethernet connectors. For example, if the cables correspond to 10base2 ethernet specifications, NICs [111] may interface with the cables through widely-available BNC-type connectors. All embodiments of the present communications system conform to ethernet physical layer specifications; all electrical connections between the NICs and the buses comply with the IEEE 802.3 standard. Column 4, lines 5-34.

Thus, in contrast to the present invention, Birkedahl only teaches the avionics component 110 being connected through the NIC 111 to **both** transmit and receive data simultaneously with **both** the pilot's side bus 107L, the co-pilot's side bus 107R. Thus, in contrast to the present invention, Birkedahl teaches only that the avionics component 110 are connected to **both** transmit and receive data simultaneously with **both** the pilot's and co-pilot's bus 107L, 107R.

Birkedahl also teaches the pilot's avionics component 110 being connected to a pilot's backup bus 107L, and the co-pilot's avionics component 110 being connected to a different co-pilot's backup bus 107RB. However, the pilot's and co-pilot's avionics component 110 are described as being connected to **both** transmit and receive on the respective pilot's and co-pilot's backup busses 107L, 107RB.

Thus, Birkedahl again fails to disclose or suggest a first processing node being connected for both transmitting and receiving on the first subset of data communication lines, but being connected for only receiving on the second subset of data communication lines; and a second processing node being connected for both transmitting and receiving on the second subset of said data lines, but being connected for only receiving on the first subset of data lines, as presently recited in claim 1.

Birkedahl also teaches the pilot's avionics components 110 being connected to transmit and receive on a pilot's backup bus 107LB, while the co-pilot's avionics components 110 are connected to transmit and receive on a different co-pilot's backup bus 107RB.

However, the pilot's and co-pilot's backup busses 107L, 107RB are largely irrelevant to the present invention because the pilot's backup bus 107LB does not connect with the co-pilot's avionics components 110, and the different co-pilot's backup bus 107RB does not connect with the pilot's backup bus 107LB. Therefore, in contrast to the present invention, the backup busses 107LB and 107RB are not shared as are the first and second subsets of data communication lines recited in claim 1.

Birkedahl also teaches a microcontroller 112 that sequences data transmissions on each bus 107. The microcontroller 112 is a "critical component" because "the timing sequence affects all components communicating on the ethernet buses 107, all NICs utilizing the buses 107 must retain identical timing tables in non-volatile memory." See, column 5, lines 13-36, which are reproduced here as follows:

> A critical component of the invention is a microcontroller 112 positioned in communication with SNICs 103. Although the electrical characteristics of data transmissions on ethernet buses 107 conform to the IEEE 802.3 standard, access to the buses is not according to the ethernet CSMA/CD scheme. Rather, the microcontroller 112 sequences data transmissions on each ethernet bus [107]

according to a table stored in a non-volatile memory 113. The table is unique to each implementation of the communications system, with each avionics component 110 being allocated a fixed amount of bandwidth in a pre-determined sequence. Each component is guaranteed periodic access to the network according to the lookup table. Hence, access to ethernet buses 107 is not CSMA/CD, but rather is synchronous and deterministic.

Because the timing sequence affects all components communicating on the ethernet buses 107, all NICs [111] utilizing the buses 107 must retain identical timing tables in non-volatile memory. Sequencing data transmissions according to a timing table allows for improved reliability, since all avionics components can anticipate and monitor the communications of other components. Moreover, each component is guaranteed periodic access to the bus, thus insuring that critical messages can be passed along the bus without delay. Column 5, lines 13-36.

Additionally, Birkedahl teaches a "heartbeat" monitoring circuit 114 connected to the microcontroller 112. This "heartbeat" monitor 114 disables transmissions on the buses 107 if power should fail or microcontroller 112 should malfunction by shutting down transceivers 101 or SNICs 103, by clearing the transmit buffer 117, or by creating an open circuit within isolation circuits 102. See, column 5, lines 37-49, which are reproduced here as follows:

In the preferred embodiments of the communications system, a circuit 114 monitors the availability of electric power and the "heartbeat" of microcontroller 112. Heartbeat signals, also known as "watchdog" signals, are based upon the frequency of data transmission and are well-known in the prior art. If power should fail or microcontroller 112 should malfunction, the monitor 114 identifies the condition and disables transmissions before corrupted data can be broadcast to other components via the ethernet buses 107. Transmissions on the ethernet buses 107 may be disabled by shutting down transceivers 101 or SNICs 103, by clearing the transmit buffer 117, or by creating an open circuit within isolation circuits 102. Column 5, lines 37-49.

Thus, the "heartbeat" monitor 114 taught by Birkedahl only "disables transmissions" on the busses 107. Additionally, the "heartbeat" monitor 114 appears to disable

transmissions on all of the busses 107 since only the plural "busses" is used, "disables transmissions before corrupted data can be broadcast to other components via the ethernet buses 107. Transmissions on the ethernet buses 107 may be disabled... ." See, column 5, lines 42-49.

At least because the "heartbeat" monitor 114 taught by Birkedahl only "disables transmissions" on the busses 107, the "heartbeat" monitor 114 cannot provide the one processing node being normally connected for both transmitting and receiving on a first subset of the data communication lines and being normally connected for only receiving on a second subset of the data communication lines; while another processing node is normally connected for both transmitting and receiving on the second subset of said data lines and is normally connected for only receiving on the first subset of data lines, as recited in claim 1.

Additionally, because the "heartbeat" monitor 114 only disables transmissions if "power should fail or microcontroller 112 should malfunction," the "heartbeat" monitor 114 cannot be relevant to the one processing node being normally connected for both transmitting and receiving on a first subset of the data communication lines and being normally connected for only receiving on a second subset of the data communication lines; while another processing node is normally connected for both transmitting and receiving on the second subset of said data lines and is normally connected for only receiving on the first subset of data lines, as recited in claim 1. Rather, "heartbeat" monitor 114 only operates in a not normal circumstance, such as power failure or "malfunction."

For at least the reasons set forth above, Birkedahl cannot and does not supply the deficiencies of Games.

Therefore, claim 1 is believed to be allowable.

Claims 16, 30 and 34 are different in scope from claim 1. However, the above arguments directed to claim 1 are sufficiently applicable to claims 16, 30 and 34 as to make repetition unnecessary. Thus, for each of the reasons above, claims 16, 30 and 34 are believed to be allowable.

Claims 31-33 are allowable as depending from allowable claim 30.

Claims 2-15, 17-29 and 31-33 were rejected under 35 USC § 103(a) as being obvious over Games and Birkedahl and further in view of US Patent 5,325,517 to Baker et al.

Claims 2-15, 17-29 and 31-33 depend from base claims 1, 16 and 30, respectively.

As is discussed above, Games fails to provide the communication lines being divided into first and second subsets, and the different processing nodes being coupled to transmit and receive on a first subset of communication lines, while being restricted from transmitting on a second subset by being limited to only receiving on that second subset of communication lines, as recited in claim 1. As is also discussed above, Birkedahl fails to provide the deficiencies of Games.

Baker merely teaches a fault tolerant data processing system wherein a first plurality of processing units concurrently perform identical operations under program control, each processor unit being coupled to hardware including fault tolerant I/O devices and storage, in which fault tolerant operations are continued so long as two of the units whose states can be compared are error free. See, Abstract.

The Baker reference fails to provide the deficiencies of Games and Birkedahl. Baker fails to disclose or suggest either a first processing node connected for only receiving on one subset of data communication lines, or a second processing node connected for only receiving on a different subset of data communication lines, as recited in claim 1.

Rather, as the Office Action notes, Baker merely provides that a plurality of processing nodes may be interconnected via a network in a fault-tolerant environment.

For each of the above reasons, base claim 1 is believed to be allowable over the Games, Birkedahl and Baker references, both individually and in combination. Claims 2-15 are allowable at least as depending from allowable base claim 1.

Base claims 16 and 30 are different in scope from claim 1. However, the above arguments directed to claim 1 are sufficiently applicable to claims 16 and 30 as to make repetition unnecessary. Thus, for each of the reasons above, claims 16 and 30 are believed to be allowable.

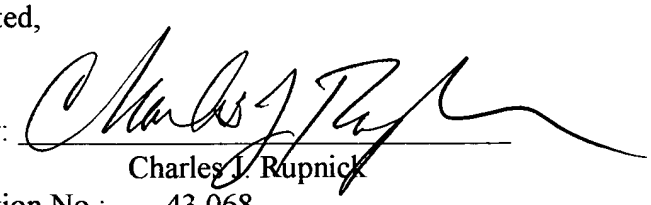
Claims 17-29 and 31-33 are allowable at least as depending from allowable base claims 16 and 30, respectively.

Claim 34 is different in scope from claim 1. However, the above arguments directed to claim 1 are sufficiently applicable to claim 34 as to make repetition unnecessary. Thus, for each of the reasons above, claim 34 is believed to be allowable.

The claims now being in form for allowance, reconsideration and allowance is respectfully requested.

If the Examiner has questions or wishes to discuss any aspect of the case, the Examiner is encouraged to contact the undersigned at the telephone number given below.

Respectfully submitted,



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